Northern Technical University
ألجامعة التقنية الشمالية

First Cycle – bachelor's degree (B.Sc.) – Cybersecurity and Cloud Computing Techniques Engineering

بكالوريوس - هندسة تقنيات الامن السيبراني والحوسبة السحابية

Table of Contents

جدول المحتويات

Mission & Vision Statement

Vision Statement

To be a creative, pioneering, and effective department in preparing national cadres specialized in cybersecurity and providing the Iraqi labor market with highly qualified cadres in the field of

cybersecurity and cloud computing technology engineering and contributes to the development and service of the local community Providing scientific and technical advice in the field of cybersecurity and infrastructure for information technology departments in various government sectors. Design and build scalable, secure, and robust security systems, in addition to working on data center systems and networks and helping institutions to Understand advanced cyber threats and create strategies to protect their networks.

Mission Statement

Preparing distinguished and competent technical engineers in the field of technical, organizational and administrative means, protecting computers, networks and data from electronic attacks, and seeking to stimulate students' scientific potential to link the theoretical basis and the applied side of the programs in order to be consistent with the approved international standards for specialization and be able to meet the needs of the governmental, mixed and private labor market, as well as building and developing cooperation relations with all engineering and technical authorities locally and internationally.

Program Specification

Program code:	BCYSCE	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

Cybersecurity engineering is an essential field in today's digital world. With the increasing number of cyber threats, it is crucial to have cybersecurity to protect highly sensitive information. The Rapid increase in the reliance of critical and personal information on cyber infrastructure has made us more vulnerable to cyber threats and cyberattacks. The Cybersecurity engineering degree programs provide students with the necessary skills and knowledge to protect computer systems, networks, and devices from cyber-attacks. The program will educate students with techniques, tools, analysis, policies, and methodologies to solve complex cyber security problems of relevance to the engineering field.

The program is based on the bologna process system. The Cyber security and Cloud Computing Techniques Engineering program extends over four levels and grants a bachelor's degree in Cybersecurity Engineering Technologies and Cloud Computing.

cybersecurity is important because it protects all categories of data from theft and damage, including sensitive data, personally identifiable information, protected health information, personal information, intellectual property, data, and governmental and industry information systems. Without a cybersecurity program, organizations cannot defend themselves against data breach campaigns, making them an irresistible target for cybercriminals.

Moreover, cybersecurity and cloud computing engineering degree programs provide students with the opportunity to learn about the latest cybersecurity technologies and practices. Students learn how to

identify and mitigate cyber threats, develop secure systems and networks, and protect sensitive data. They also learn about cybersecurity laws and regulations, ethical hacking, and incident response.

Earning a cybersecurity and cloud computing engineering degree is worth the investment. The cybersecurity job outlook is fantastic, and salaries are high. However, to land the best jobs in cybersecurity with the best companies, you need a degree, and when it comes to cybersecurity, the higher the degree at Northern Technical University, the better.

At level 1 of a cybersecurity and cloud computing techniques engineering degree program, students should be exposed to fundamental concepts and principles in cybersecurity and cloud computing. Here are some topics that could be covered: introduction to cybersecurity principles and concepts, digital design, electrical engineering, computer programming, math, Linux administration, and sociology and human rights and democracy.

At level 2, and 3 of a cybersecurity and cloud computing techniques engineering degree program, students will be introduced with a strong foundation in cloud computing and cybersecurity, including the ability to identify and assess potential threats, develop secure systems, and analyze data to improve cybersecurity. Additionally, students will gain knowledge of programming languages and tools commonly used in cybersecurity, as well as an understanding of the Cybersecurity Workforce Framework, which provides a comprehensive guide to cybersecurity roles and responsibilities. Moreover, At level 2, and 3 security principles such as systems and services, networking and security, scripting and programming, data management, and the business of IT security.

At level 4, of a cybersecurity and cloud computing techniques engineering degree program, students will gain knowledge about Cyber threats, security requirements, data collection and analysis, and dissemination of results. Moreover, students will gain knowledge about problem-solving techniques and analytical skills needed for cybersecurity and related degree programs.

At Level 4 all students carry out an independent research project.

Lab's tutorials are held at Levels 1,2,3, and 4. In addition, Academic tutorials at Levels 1,2,3, and 4 with the same tutor, who is also the personal tutor, providing continuity and progressive guidance. International transfer to certain university with the same degree program whom NTU signed with a MOU are offered and individual needs are discussed with the appropriate tutor and accommodated wherever possible. Industrial placements are also offered, and individual needs are discussed with the appropriate tutor and accommodated wherever possible.

Program Objectives.

1. Preparing engineering cadres with a high level of understanding, knowledge and academic and technical preparation that combine engineering perceptions, technical creativity, scientific skill and quality of implementation in the field of engineering cybersecurity technologies and cloud computing.

2. Preparing engineering cadres who are responsible for building, designing and protecting information technology systems in institutions to prevent data breaches, keep them safe from hackers, viruses and other potential problems, supervise and build network infrastructure of various types and available systems. And follow up the problems of network infrastructure

devices and protection devices and provide guidance and solutions regarding various problems.

3. Preparing engineering cadres with the scientific and technical skill that enables him to master dealing with cloud computing operations, using vulnerability examination tools to detect various technical problems, follow up on the failure and evaluation of security patches, mitigate security vulnerabilities, and provide assistance in security documentation and disaster recovery solutions.

4. Preparing engineering cadres that possess the technical and scientific skill that enables him to analyze data records and conduct risk assessments in the event of security breaches to know the parts of the system that have been compromised and where the danger lies. Data breaches and secure systems to explore potential vulnerabilities to ensure the integrity of network systems.

5. Permanent development of study programs through cooperation with Arab and international academic institutions to suit the requirements of Iraqi and local cybersecurity programs and the needs of the labor market and provide a suitable environment for theoretical and practical teaching using the latest educational means.

6. Continuous rehabilitation of the capabilities of faculty members, technicians, and administrators in the department through participation in seminars, conferences and workshops held by the department or the corresponding departments in local and international universities.

7. Cooperating with the departments to follow up the department's graduates and continuously evaluate their performance to ensure effective contribution to community service after graduation in accordance with a future and vision to develop and expand the circle of community participation.

8. Providing technical and academic consultations in the field of cybersecurity and cloud computing to government and academic institutions

9. Adopting effective theories to develop the capabilities of the department in conducting research and studies and preparing study supplies to suit quality standards in the Ministry of Higher Education, Scientific Research and Community Service through graduates equipped with various knowledge that qualifies them to excel in their field of work and are able to adapt to various working conditions and keep pace with the rapid developments in the field of specialization while respecting the ethics of the profession.

Student Learning Outcomes

Outcome 1

Graduates will be able to develop technical knowledge and skills needed to secure computer systems and networks.

Outcome 2

Graduates will be able to Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Outcome 3

Graduates will be able to Apply knowledge of mathematics, science, and engineering to design and implement secure computer systems and networks.

Outcome 4

Graduates will be able to Analyze the local and global impact of computing on individuals, organizations, and society.

Outcome 5

Graduates will be able to Apply current techniques, skills, and tools necessary for cyber defense within an organization.

Outcome 6

Graduates will be able to Ensure information security strategies align with business objectives that follow relevant laws and regulations.

Outcome 7

Graduates will be able to Develop an understanding of cloud computing technologies and their applications.

Outcome 8

Graduates will be able to Develop an understanding of the security challenges and solutions associated with cloud computing.

Outcome 9

Graduates will be able to develop an understanding of the legal and ethical issues related to cyber security and cloud computing.

Outcome 10

Graduates will be able to develop effective communication and teamwork skills to work collaboratively on cyber security and cloud computing projects.

Outcome 11

Oral and Written Communication

Graduates will be able to formally communicate the results of biological investigations using both oral and written communication skills.

Outcome 12

Data Analyses

Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analyses.

Outcome 13

Critical Thinking

Graduates will be able to use critical-thinking and problem-solving skills to develop a research project and/or paper.

Academic Staff

Dr. Razan Abdulhammed | Ph.D. in Computer Science and Engineering | Lecturer

Email: rabdulhammed@ntu.edu.iq

Mobile no.: 07702784250

Dr. Fadwa S. Alezzo | Ph.D. in | Lecturer

Email:

Mobile no.:

Dr Zakaria Nooruddin Mahmood | Ph. D in Computer Science | Lecturer

Email: @ntu.edu.iq

Mobile no.:

Dr. Rabei Raad Ali | Ph. D in Computer Science and Information Technology | Assistant Prof.

Email: rabei@ntu.edu.iq

Mobile no.: 07701685599.

Rana Khalid Sabri | M.Sc. in Computer Engineering. | Assistant Lecturer.

Email: Mti.lec39.rana@ntu.edu.iq

Mobile no.: 07738502216

Afaf Nasser Yousif |M. Sc. in   Mathematics | Assistant Lecturer.

Email: Afaf.nasser@ntu.edu.iq

Mobile no.: 07510590803

Lubab Harith Sami |M. Sc. in   Computer Engineering. | Lecturer

Email: lubab_Harith@ntu.edu.iq

Mobile no.:

Shaima Makdad Mohammed Najeeb |M. Sc. in   Computer Engineering. | Lecturer

Email: Shima_mohammed@ntu.edu.iq

Mobile no.:

Dr. Younis Alrazzo | Ph. D in Computer Engineering | Lecturer

Email: Younes_Alrazzo@ntu.edu.iq

Mobile no.:

Dr. Arwa H. Saleh I Ph. D in Computer Networking | Lecturer

Email: arwa_Saleh@ntu.edu.iq

Mobile no.:

Credits, Grading and GPA

Credits

Northern Technical University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	**التقدير**	**Marks (%)**	**Definition**
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   CGPA of a 4-year B.Sc. degree:

   CGPA = [(1st Module score x ECTS) + (2nd Module score x ECTS) + ……] / 240

Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BCYSCE100-S1	Mathematics	64	61	5.00	S	
BCYSCE105-S1	Linux Administrator	79	96	7.00	C	
BCYSCE102-S1	Fundamentals of Programming	79	96	7.00	C	
BCYSCE104-S1	Fundamentals of Electrical Engineering	79	96	7.00	S	
BCYSCE103-S1	Introduction to Sociology	33	67	4.00	B	
NTU100	Human rights and Democracy	35	15	2	E	
NTU101	English	35	15	2	E	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BCYSCE101-S2	Digital Electronics	79	96	7.00	S	
BCYSCE106-S2	Introduction to Probability and Statistics	64	61	5.00	S	BCYSCE100-S1
BCYSCE107-S2	Object oriented programming	79	96	7.00	S	BCYSCE102-S1
BCYSCE108-S2	Introduction to Cyber security Engineering	79	96	7.00	C	
NTU103	Arabic Language	35	15	2	B	
NTU102	Computer	45	5	2	B	
NTU104	Physical Education	20	30	2	E	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BCYSCE200-S1	Computer Electronics	78	52	4.00	S	BCYSCE101-S2
BCYSCE205-S1	Discrete Math	48	55	4.00	S	
BCYSCE202-S1	Database system	78	52	4.00	C	
BCYSCE204-S1	Python Programming for Cybersecurity	78	76	5.00	C	
BCYSCE203-S1	Operating Systems	78	77	4.00	S	
NTU203	Bath Party Crimes	35	15	2	B	
NTU200	English language	35	15	2	B	NTU101
BCYSCE200-S1	Computer Networks	48	55	5.00	S	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BCYSCE205-S2	Data structures	79	46	4.00	S	
BCYSCE202-S2	Database security	78	47	5.00	C	BCYSCE102-S1
BCYSCE204-S2	Computer Organization and Architectures	79	71	5.00	S	
BCYSCE203-S2	Network Security	78	47	6.00	C	BCYSCE200-S1
NTU202	Arabic Language	79	71	2.00	B	
NTU 204	Cybersecurity Professional ethics	33	42	2.00	B	
BCYSCE201-S1	Network Administration and Infrastructure	35	15	4.00	C	NTU202
NTU201	Computer	35	15	2.00	B	NTU102

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BCYSCE300-S1	Introduction to Cryptography	63	87	6	C	
BCYSCE305-S1	Introduction to Hardware security	65	110	7	C	
BCYSCE302-S1	Digital Signal Processing	63	37	5	S	
BCYSCE304-S1	Mobile and wireless networks	64	61	5	C	
BCYSCE303-S1	Fundamentals of Cloud computing	65	110	7	C	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BCYSCE300-S2	Mobile and wireless networks security	64	61	5	C	BCYSCE304-S1
BCYSCE305-S2	Secure software development	63	62	5	C	BCYSCE102-S1, BCYSCE107-S2
BCYSCE302-S2	Operating system security	64	61	5	C	BCYSCE203-S1
BCYSCE304-S2	Practicing cybersecurity: Attacks and Countermeasures	49	76	5	C	
BCYSCE303-S2	Engineering Analysis	63	37	4	S	
BCYSCE301-S2	Cloud Computing security	64	86	6	C	BCYSCE303-S1

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BCYSCE400-S1	**Intrusions Detection and prevention System**	**78**	**72**	**6.00**	**C**	
BCYSCE405-S1	**Research Methodology**	**49**	**26**	**3.00**	**B**	
BCYSCE402-S1	**AI for Cybersecurity Engineering**	**79**	**71**	**6.00**	**C**	
BCYSCE404-S1	**Practicing cybersecurity: Ethical Hacking and Vulnerability**	**63**	**112**	**7.00**	**C**	
BCYSCE403-S1	**Cloud Application**	**79**	**46**	**5.00**	**S**	
BCYSCE401-S1	**Graduation Project Design**	**34**	**41**	**3.00**	**S**	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BCYSCE400-S2	**IT Project Management**	**63**	**62**	**6.00**	**S**	
BCYSCE405-S2	**Graduation Project Implementation**	**34**	**66**	**3.00**	**S**	**BCYSCE401-S1**
BCYSCE402-S2	**Introduction to Digital Forensics**	**79**	**96**	**7.00**	**C**	
BCYSCE404-S2	**IoTs and Cybersecurity**	**79**	**96**	**7.00**	**C**	
BCYSCE403-S2	**Reverse Engineering-Malwares Analysis**	**79**	**96**	**7.00**	**C**	

Contact

Program Manager:

Dr. Razan Abdulhammed | Ph.D. in Computer Science and Engineering | Assistant Prof.

Email: rabdulhammed@ntu.edu.iq

Mobile no.: 07702784250

Program Coordinator:

Dr. Fadwa S. Alezzo | Ph.D. in | Assistant Prof.

Email: Fadwa_Alezzo@ntu.edu.iq